Electronic Waste Disposal Behavior: A Qualitative Analysis in the Framework of Behavioral and Technological Factors

Elektronik Atık Elden Çıkarma Davranışı: Davranışsal ve Teknolojik Faktörler Çerçevesinde Nitel Bir Analiz

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ABSTRACT

Sustainability is one of the most critical issues of our time. Although sustainability is such a popular topic, the concept and methods of sustainable disposal occupy a very limited space in the minds of consumers. When it comes to different waste groups such as electronic waste, consumers may even show a tendency to avoid sustainability-related behavior. This study examines consumers' electronic waste disposal behaviors and the factors that encourage or hinder this process. Semi-structured interviews conducted with 11 participants selected through purposeful sampling were evaluated using the MAXQDA program and the thematic analysis method. The findings show that expectations of economic benefit and accessible recycling infrastructure encourage sustainable disposal, while insecurity, lack of awareness, and inadequate infrastructure act as hindering factors. The study offers suggestions to improve consumer behavior and serves as a guide for policy makers and practitioners. The findings are expected to meaningfully contribute to the development of electronic waste management strategies.

JEL Codes: M31, Q56, D12

Keywords: Electronic Waste, Sustainable Disposal Behavior, Qualitative Research

ÖZ

Sürdürülebilirlik günümüzün en önemli konularından biri olmasına rağmen, tüketicilerin sürdürülebilir elden çıkarma kavramına ilgisi sınırlıdır. Elektronik atık söz konusu olduğunda, bazı tüketiciler sürdürülebilirlikten kaçınma eğilimi bile gösterebilmektedir. Bu çalışma, tüketicilerin elektronik atık elden çıkarma davranışlarını ve bu süreci teşvik eden ya da engelleyen faktörleri incelemektedir. Amaçlı örnekleme ile seçilen 11 katılımcıyla yapılan yarı yapılandırılmış mülakatlar, MAXQDA programıyla tematik analiz yöntemi kullanılarak değerlendirilmiştir. Bulgular, ekonomik fayda beklentisi ve erişilebilir geri dönüşüm altyapısının sürdürülebilir elden çıkarmayı teşvik ettiğini; güvensizlik, farkındalık eksikliği ve altyapı yetersizliklerinin ise engelleyici faktörler olduğunu göstermektedir. Çalışma, tüketici davranışlarını iyileştirmek için öneriler sunarken, politika yapıcılar ve uygulayıcılar için rehber niteliğindedir. Bulguların, elektronik atık yönetimi stratejilerinin geliştirilmesine katkı sağlayacağı öngörülmektedir.

JEL Kodları: M31, Q56, D12

Anahtar Kelimeler: Elektronik Atık, Sürdürülebilir Elden Çıkarma Davranışı, Nitel Araştırma

Introduction

Technological developments in various sectors and fields such as education, industry, health, etc. have brought about an increase in demand for electronic devices, devices, and equipment (Michael et al., 2024). This increase in demand and increasingly short product life cycles have made electronic waste (e-waste) one of the fastest growing waste categories worldwide. E-waste causes significant environmental, economic, and sociological challenges. According to the United Nations Global E-Waste Monitoring Report, e-waste production, which was 34 million tons in 2010, increased to 62 million tons in 2022 and is expected to reach 82 million tons in 2030. It has been documented that only 22.3% of the approximately 62 million tons of e-waste generated in 2022 were properly collected and recycled (Balde et al., 2024). This rate shows that e-waste production is increasing 5 times faster than e-waste recycling rate. While the production and consumption of electronic devices continues to increase rapidly on a global scale, it is seen that e-waste management infrastructure cannot keep up with this pace and the recycling rate remains below expectations. This low recycling rate goes beyond environmental concerns and highlights an urgent problem that also concerns economic policies and resource management strategies.

Managing e-waste effectively is crucial for protecting natural resources, reducing pollution and recovering valuable materials. In addition, consumer behavior plays an important role in shaping the effectiveness of e-waste disposal efforts. Various psychological, social and structural factors affect individuals' participation in sustainable disposal behaviors. Theories such as the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM) provide useful frameworks based on scientific foundations for understanding these behaviors. Within the scope of the study, TPB suggests that an individual's intention to participate in sustainable disposal behavior is influenced by attitudes, subjective norms and perceived behavioral control. TAM emphasizes the role of perceived benefits and ease of use in the adoption of new waste management technologies such as smart recycling bins and digital waste disposal platforms (e.g. mobile recycling applications).

Beyond individual behaviors, macro-level factors such as government policies, regulatory frameworks, and public awareness campaigns also shape e-waste management outcomes. While policy interventions are necessary, understanding consumer attitudes and motivations is equally important for designing effective waste management strategies. Because the consumer is the initiator of the recycling cycle. Ignoring the role of the consumer in this cycle turns the consumer into the missing link in the supply chain.

Studies in the literature show that inadequate recycling infrastructure, economic disincentives, and distrust of waste management systems are the biggest obstacles to sustainable/responsible e-waste disposal behavior (Laeequddin et al., 2022; Michael et al., 2024; Mohammad et al., 2022; Shevchenko et al., 2019). Considering these concerns, this study aims to explore the main drivers and barriers affecting sustainable e-waste disposal behaviors. Using a qualitative research approach, this study investigates the attitudes, intentions, and perceptions of consumers towards e-waste management. It is anticipated that the thematic analysis of the study conducted using MAXQDA software within the scope of the theories of TPB and TAM will provide a deeper understanding of these behaviors. This research is planned to contribute to sustainable waste management from both micro and macro aspects by examining both psychological and structural factors affecting e-waste disposal behavior. It also aims to support the development of more effective and consumer-oriented e-waste management strategies by providing practical recommendations for policy makers and industry stakeholders.

Theoretical Framework

The sustainable disposal process of electronic waste (e-waste) is closely related to the psychological, social, and structural factors that affect consumers (Heidari et al., 2021; Wang et al., 2019). This process is affected by factors such as consumers' attitudes towards recycling and sustainable waste management practices, perceived social norms, and environmental awareness levels (Ajzen, 1991; Chen & Tung, 2014). In order to better understand consumer behavior and analyze the disposal process of consumers, this study utilized two well-established theoretical models, the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM). These theoretical frameworks provide theoretical foundations for the cognitive and contextual factors that affect consumers' e-waste disposal decisions (Li et al., 2020). While TPB theoretically bases the psychological factors that shape consumers' attitudes and intentions towards sustainable e-waste disposal behavior, TAM emphasizes the impact of technological factors on sustainable e-waste disposal behavior (Davis, 1989; Kaffash et al., 2021).

Theory of Planned Behavior (TPB)

Theory of Planned Behavior (TPB) was developed by Ajzen in 1991. This theory suggests that an individual's intention to engage in a certain behavior is affected by three main components: attitudes, subjective norms, and perceived behavioral control. Within the scope of the theory, individuals' views on the positive or negative consequences of a certain behavior are expressed as attitudes (Ajzen, 1991). In the context of the study, it is expected that individuals with positive attitudes towards recycling and sustainability will be more likely to adopt sustainable disposal practices (Chen & Tung, 2010). Subjective norms refer to the perceived social pressure to perform or not perform a behavior. In the context of the study, if individuals believe that their peers or society value sustainable disposal behavior, they are expected to be more likely to participate in recycling activities (Ylä-Mella et al., 2020). Within the scope of the Theory of Planned Behavior, the degree to which individuals feel they have the ability and resources to perform a behavior is expressed by the concept of perceived behavioral control. In the study, factors such as access to recycling facilities, knowledge and convenience regarding sustainable disposal methods are expected to play an important role in determining whether individuals will engage in sustainable e-waste disposal behavior (Kaffash et al., 2021). By integrating these elements of the theory into the study, a comprehensive framework is provided to understand how cognitive and social influences shape consumers' waste disposal behavior.

Technology Acceptance Model (TAM)

The Technology Acceptance Model, a model that defines how individuals adopt and use technology-focused systems, was put forward by Davis (1989). In the context of the study, TAM is an important model for analyzing consumers' interaction with e-waste disposal systems. Especially considering the increasing trust and need for digital solutions for waste management (e.g. smart recycling bins, mobile applications for e-waste collection, etc.), TAM provides a theoretical basis for the study in understanding consumer behavior. The model consists of two basic determinants: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which individuals believe that a system increases efficiency or provides tangible benefits. Within the scope of the study, it is expected that well-structured recycling programs and incentives (e.g. trade-in discounts) can increase perceived usefulness and encourage participation

in using sustainable disposal methods (Song et al., 2012). Another important structure related to the model is perceived ease of use. Perceived ease of use refers to the degree to which individuals find a system user-friendly. When this structure is considered in the context of the study, it is expected that if the infrastructure facilities of e-waste disposal systems are complex or inconvenient, the rate of adoption of sustainable disposal methods will tend to decrease. Simplified processes such as accessible waste drop-off points and clear instructions on sustainable disposal will increase participation in sustainable disposal behavior (Kahhat & Williams, 2009). Combining TPB and TAM, this study provides a comprehensive theoretical framework to analyze the psychological and technological drivers of e-waste disposal behavior. With the integration of these models, how attitudes, social influences, and perceived system usability interact to shape consumer behavior will be examined within the scope of the study. With this theoretical approach, this study provides critical insights not only for researchers but also for policy makers and industry leaders who want to develop sustainable waste management strategies.

Methodology

The study aimed to make sense of consumers' e-waste disposal behaviors. Within the scope of this purpose, it is necessary to examine consumers' motivation sources, perceptions, attitudes and decision-making processes in depth. In order to carry out this comprehensive examination, a qualitative research design was used in the study to determine the main factors affecting consumers' sustainable disposal behaviors (Creswell, 2013). This study was prepared in accordance with the rules of scientific research and publication ethics, and the consent of the participants who participated in the study was obtained. The Ethics Committee approval of the research was obtained by the decision of the Yıldız Technical University Social and Human Sciences Research Ethics Committee, dated 28.01.2024 and numbered 2024.01.
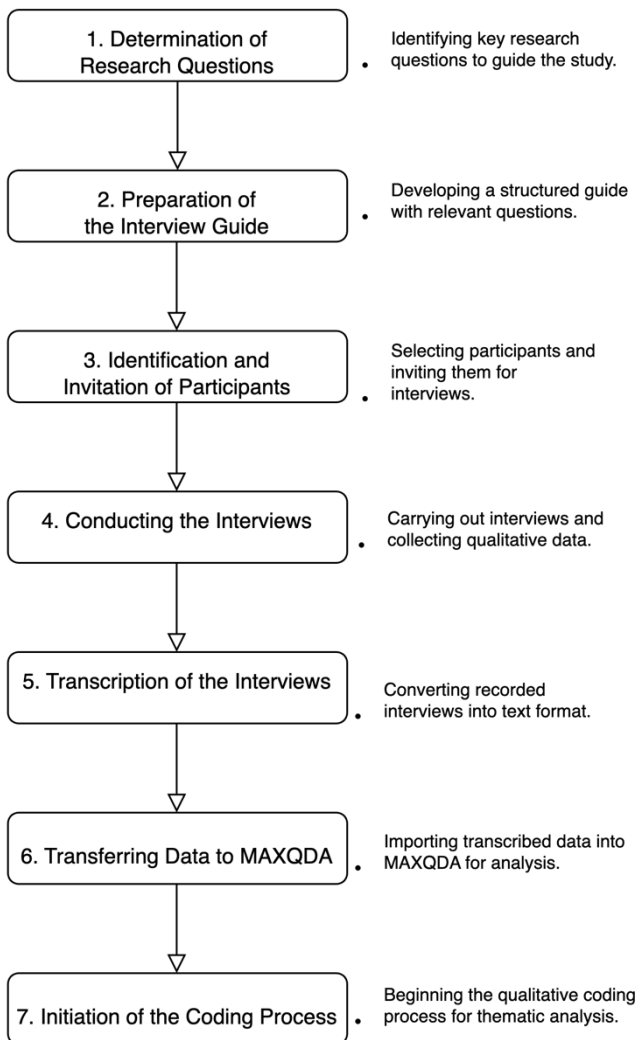
Research Approach and Design

A phenomenological research approach was adopted in this study, which focuses on understanding the meanings that individuals attribute to their experiences and actions (Moustakas, 1994). A qualitative method was chosen to analyze the complexity of consumer behaviors related to e-waste management. This method allowed the researchers to examine the participants' motivations, challenges and thought processes regarding sustainable

disposal methods in more depth. The data collection process in the study was designed in a systematic way. The Flow Diagram of the Research Process (Figure 1) shows the steps that summarize each stage of the study. These stages are as follows:

Figure 1.

Research Process Flow Diagram

1. Determination of Research Questions — Identifying key research questions to guide the study.

2. Preparation of the Interview Guide — Developing a structured guide with relevant questions.

3. Identification and Invitation of Participants — Selecting participants and inviting them for interviews.

4. Conducting the Interviews — Carrying out interviews and collecting qualitative data.

5. Transcription of the Interviews — Converting recorded interviews into text format.

6. Transferring Data to MAXQDA — Importing transcribed data into MAXQDA for analysis.

7. Initiation of the Coding Process — Beginning the qualitative coding process for thematic analysis.

The data for the study were collected through semi-structured in-depth interviews. In semi-structured interviews, participants were allowed to express their perspectives freely while ensuring participant consistency (Kvale, 2007). The research questions and interview guide (Table 1) were prepared by taking into account the existing literature and expert opinions, while being careful to be consistent with the objectives of the study.

Table 1.

Research Questions and Interview Guide

General Research Question:
What factors influence consumers in Turkey to engage in sustainable e-waste disposal behaviors, such as recycling, repairing, or selling/donating second-hand electronics?
Research Questions:
1.What methods do you use to dispose of end-of-life electronic products?
2.Do your disposal methods vary depending on the type of electronic product? If so, which methods do you use for different product categories?
3.What does sustainable disposal mean to you? Are you aware of sustainable disposal methods (e.g., recycling, repairing, selling/donating second-hand electronics)?
4.For which types of electronic products do you primarily use sustainable disposal methods?
5.What is electronic waste (e-waste)? (Are you aware of e-waste?)
6.In your opinion, which products fall under the category of e-waste? What do you do with your end-of-life electronic devices, and why?
7.What potential risks (or consequences) do you think e-waste poses?
8.Do you believe e-waste has economic value?
9.What incentives would motivate you to dispose of e-waste sustainably?
10.Why do consumers refrain from sustainable e-waste disposal? What barriers do they perceive? What obstacles do you personally encounter?

The open-ended interview questions presented in Table 1 were designed to obtain information about the participants' attitudes, intentions, and perceptions regarding e-waste disposal behavior. In addition to these questions, demographic information such as age, gender, occupation, and education level was also collected to better understand the factors that shape the behaviors of individuals (Silverman, 2014).

In the current study, purposive sampling was used to select 11 participants. This sampling method allows for rich, detailed insight by choosing especially knowledgeable participants about or experienced with the phenomenon of interest (Patton, 2015). Due to the limited nature of the qualitative research approach, we included only 11 participants, seeking depth over breadth to obtain rich insights specifically and not necessarily generalizable findings. Data saturation was reached even before the final interviews (n = no new themes or information), supporting

that the sample size was appropriate.Participants were further recruited from individuals with a minimum of doctoral-level education to include the highest level of conceptual knowledge and critical reflection of the themes presented by the research. The study sought not only to be comprehensive but the sample was also built as to have different perspectives such as age, gender, occupation and field of expertise.

All interviews were conducted face-to-face in an environment that allowed the participants to speak openly about their experiences. Ethical approval for the study was obtained from the Yıldız Technical University Ethics Committee in 2024.

Data Analysis

Thematic analysis was used to analyze the qualitative data collected from the interviews. Thematic analysis is a method that allows the identification of patterns and recurring themes in the data set (Braun & Clarke, 2006). The analysis process consisted of data definition, coding, theme definition, and data interpretation steps, respectively. In the data definition stage, the transcriptions were examined to understand the responses. In the second step, the coding stage was initiated, and the main expressions and concepts were systematically categorized. In the third step, the codes were grouped into overarching themes based on theoretical frameworks (TPB and TAM) and interpreted. Finally, the findings were explained in the context of existing literature and theories to obtain meaningful results. MAXQDA software was used to organize and analyze the qualitative data to increase reliability (Silver and Lewins, 2014). In addition, the triangulation method was applied, where more than one researcher examined the coding process to ensure consistency and minimize bias. Using this methodological approach facilitated the study findings to provide a comprehensive and reliable understanding of consumers' e-waste disposal behavior. Although the study specifically investigates sustainable electronic waste disposal behavior, some participants interpreted questions regarding "sustainable disposal" more broadly and referred to behaviors related to other product categories (e.g., clothing or books). These responses, while not directly about e-waste, were retained in the findings as they reflect participants' holistic understanding of sustainability and disposal habits. Nevertheless, the thematic emphasis of the study remains on electronic waste.

Results

This section presents the analysis of qualitative data regarding the factors influencing the sustainable disposal of electronic waste by individuals. The findings of the thematic analysis, conducted using MAXQDA software, are examined in detail and supported with graphs and figures.

Demographic Information of Participants

Participants' demographic characteristics were analyzed in depth to understand the variation in e-waste disposal behavior, by age, gender, occupation and education. These details are presented under the heading Table 2. Demographic Distribution.

The study participants are aged 25 to 54 are divided into three groups: 25–34 years (54.5%), 35–44(27.3%) and 45–54(18.2%). Different age cohorts make for a nice comparative study on how various generations act towards e-waste management.

Gender distribution is 55% women and 45% men among participants. A clear ground for subsequent analysis of gender impacts on e-waste management is thus provided by this balanced representativeness. Also, each participant has a doctor in degree overall which allows for a detailed look at e-waste disposal patterns in the community of highly educated individuals. Occupational status was classified as Public Sector Employees (90.9 %) and Private Sector Employees (9.1%).

The results provide insights into how demographic factors, coupled with occupation and education levels, inform behaviors related to electronic waste disposal at the individual level.

Table 2.

Demographic Distribution

| Variables	Categories	Freq. (n)	Percent. (%)
Age	25-34	6	54.5
	35-44	3	27.3
	45-54	2	18.2
Gender	Female	6	55
	Male	5	45
Education	pHD	11	100
Occupation	Public Employee	10	90.9
	Private Sector	1	9.1

Coding Process and Thematic Analysis

This study focuses on understanding consumers' waste disposal behaviors and examining these behaviors within the framework of sustainability. The frequencies of the themes and subcodes determined within the disposal behavior hierarchical code-subcode model in Figure 2 are visualized. These themes and subcodes are explained in more detail within the hierarchical model presented in Figure 2. The frequency of each code in the text is shown with the n value.

The model reveals that although sustainable waste disposal behaviors are more common, unsustainable methods also occupy an important place. The findings regarding disposal methods are divided into two main themes: sustainable disposal behaviors (n=100) and unsustainable disposal behaviors (n=46).

Figure 2.

Disposal Behavior Hierarchical Code-Subcodes Model
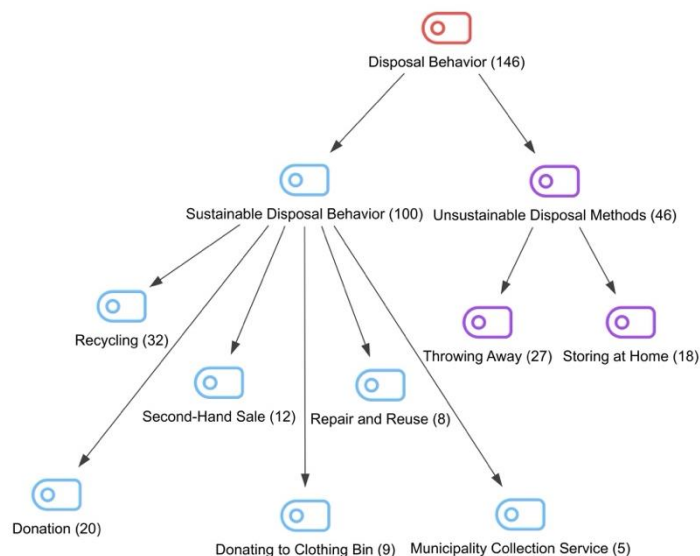
Sustainable Disposal Behaviors

According to the research findings, sustainable disposal behaviors were referred to 100 times in total during the interviews conducted with the participants. The six most frequently repeated basic sub-codes emerged within the scope of sustainable disposal behaviors. These codes were determined as recycling (n = 32), donating (n = 20), second-hand sales (n = 12), throwing in clothing collection boxes (n = 9), repairing/reusing (n = 8) and municipal collection services (n = 5). These results show that individuals adopt various strategies and methods within the framework of sustainable disposal practices.

Recycling

Recycling (n = 32) was the most frequently mentioned sustainable disposal method among the participants. The participants emphasized that they included paper and other types of waste in sustainable recycling processes. For example, one participant expressed their recycling habits as follows:

Participant 6: "On the other hand, I usually try to recycle products such as paper. Especially books. Let me give you an example. After the university exam, I had a lot of test books left, for example, I recycled them."

In addition, some participants expressed their awareness about recycling electronic waste.

Participant 7: "I know about batteries because there are places in schools where you can leave them."

According to these findings, it is seen that individuals' awareness levels vary according to different types of waste and that recycling practices are shaped by personal habits.

Donation

Although the study focuses specifically on electronic waste disposal behaviors, some participants shared broader examples of sustainable disposal practices during the interviews. In particular, donation behaviors related to clothing or household items were frequently mentioned. These responses illustrate participants' comprehensive view of sustainability, suggesting that for many, environmentally responsible behaviors are part of a wider ethical lifestyle. While these examples are not directly related to e-waste, they were included as they provide contextual insight into participants' general disposal mindsets, which also influence how they treat electronic products. Many participants explained that they like donation as one of the disposal methods to be sustainable (n = 20). Giving to those in need or charities in particular shows that individuals are driven by eco-consciousness beyond the environment, but also social responsibility. A participant articulated that she put up with the clothes she no longer used and shared with those who need them:

Participant 1: "I usually don't throw away clothes. If they are usable, I give them to my relatives."

And another participant shared her motivation for donating as:

Participant 6: "I usually prefer to give them to someone

else in need. It could be a relative of mine or someone in need."

Donation behavior is not limited to sustainable consumption in the literature. This behavior also has an important place within the scope of inclusive consumption and circular economy concepts (Bocken et al., 2016). This shows that the donation behaviors of the participants are not only individual preferences, but also influenced by social solidarity and collective consumption.

Second-Hand Sale

There is an important position for second hand sales as a sustainable disposal of strategies among the participants. Usually, a couple of main motivations (to sell secondhand for financial gain and drive reuse of goods) were commonly cited by participants. For example, one participant stated that he preferred to sell electronic products for economic reasons.

Participant 5: "I generally prefer to sell electronic products more."

On the other hand, another participant emphasized that second-hand sales are not only financially beneficial, but also important for sustainable consumption.

Participant 7: "For clothes. Now, when you say second-hand sales, this came to my mind, of course. When I first came to Istanbul and it was during the pandemic, I sold my products when I had a lot of time. Because I had a lot of things. Also, because I loved second-hand vintage products and bought a lot of them at the time but never wore them, I sold them on the same platforms. But it requires serious effort."

These findings are also consistent with the concept of collaborative consumption, which shows that individuals contribute to a sustainable consumption model by contributing their belongings to the second-hand market (Botsman & Rogers, 2010).

Donating to Clothing Bin

While not directly related to electronic waste, some participants discussed donation behaviors involving other product types, such as clothing. These responses reflect a broader interpretation of "sustainable disposal," suggesting that participants conceptualize sustainability as a general lifestyle practice rather than one limited to electronics. For example, several participants (n = 9)

reported using clothing collection boxes to dispose of textile products instead of discarding them. This practice indicates a high level of environmental and social responsibility, even beyond the context of e-waste.

Participant 1: "I usually never throw away clothing. If it is definitely usable, I give it to my relatives, I put it in clothing bins, etc."

Similarly, some participants stated that although they do not use clothing bins regularly, they occasionally choose this method.

Participant 8: "When I see clothing bins, I mean, not always, but mostly, if they are not in very bad condition, I put the ones in good condition in clothing bins."

These findings show that clothing collection boxes serve as an important tool in sustainable disposal processes and that individuals actively evaluate this method.

Repair and Reuse

Repair and reuse (n = 8) as reported by participants one of the core strategies of sustainable consumption. When stuff is no longer usable, participants said that they would repair or reuse them rather of just discarding them. Participation of course that attests that people do strive to make their things last longer despite the behaviour participants have been doing.

Participant 7: "For example, my toaster is broken. I can't throw it away. I'll give it to someone, it's broken right now, but someone can fix it and use it."

Participants also noted that they know repair to be of deep importance in the context of sustainable consumption.

Participant 11: "Getting it repaired is a sustainable method."

These statements show that individuals act with the aim of extending the lifespan of products and preventing waste, and that they align their behaviors with sustainable consumption practices.

Municipal Collection Services

Municipal waste collection services (n = 5) were also identified by participants as an important sustainable waste disposal method. The reliability of municipal services was expressed by the participants especially regarding the disposal of large items.

Participant 3: "For example, if it is a very big thing, there are the opportunities provided by the municipalities. You call them, they can come to your house and pick it up. You can use it. We were going to throw away the sofa set. We told them that. We informed Kağıthane Municipality. They said they would come at this time. They came and picked it up."

In addition, some participants expressed that they trust the waste management and separation processes of the municipalities.

Participant 11: "One of my thoughts here is that the municipality, the state, steps in anyway, separates these and takes the necessary steps accordingly, in other words, I actually pay attention to this because I trust them. How true, of course. I don't know if they separate them afterwards or what they do. I feel like I have to trust them."

These findings show that municipal services offer an important alternative for sustainable disposal and that public institutions play an important role in shaping individuals' waste management behaviors.

Other Sustainable Disposal Methods

In addition to the hierarchical coding model, participants mentioned several sustainable disposal methods that they occasionally prefer in certain situations. These alternative approaches include sustainable disposal methods such as selling to scrap dealers (n = 4), extending product life (n = 4), returning products to suppliers (n = 3), and reusing products for different uses (n = 3).

Some participants stated that selling large products to scrap dealers is a practical solution for disposing of products.

Participant 1: "I don't know why, but those campaigns don't appeal to me at all. I don't think we've ever benefited from them. But it can also happen with white goods, it makes sense there too. Because removing large items is a bigger problem. I mean, even removing them from the house is already a problem, when a scrap dealer is a scrap dealer, it actually has that convenience. They take it and take it away, so you don't have to deal with it." - Selling to Scrap Dealers

A few participants emphasized that when purchasing a new electronic device, they prefer to return the old one to the supplier and contribute to the recycling process.

Participant 5: "If I buy a new technological product, I give my old product to the place where I bought it to extend the warranty period rather than throwing it away. Because it is thrown away, it will be of no use. At least I give the parts that can be used to the supplier so that they can buy it and make it usable again." – Returning to the Supplier

Participants also stated that they aim to minimize waste by using their items for as long as possible.

Participant 2: "I generally do not sell second-hand. In other words, I usually use the product until it wears out. Therefore, it does not even have the capacity to consider second-hand. Therefore, I generally do not sell it." – Extending the Lifespan

Some participants stated that they reuse items that are no longer functional for alternative purposes.

Participant 1: "I usually give away my clothes that are still usable to my close circle. Or these are the piggy banks, I throw clothes in them. I think we also throw the ones that are not usable in those piggy banks. Or the ones that are really bad can be thrown away as a washcloth or a floor cloth." – Reuse for a Different Purpose

Unsustainable Disposal Methods

A total of 46 times unsustainable disposal methods were mentioned in the interviews conducted with the participants. Unsustainable disposal methods fall into two main subcategories: throwing things away (n = 27) and keeping them at home (n = 18). Participants generally stated that they resorted to these methods due to lack of information or difficulty accessing recycling opportunities.

Throwing Away

A total of 27 times during the interviews, participants stated that they throw away their electronic waste directly. Participants generally stated that they throw away their broken or unusable electronic products directly due to lack of awareness about recycling opportunities or because the repair costs are almost the same as buying a new product.

Two participants explained this dilemma as follows.

Participant 2: "For example, my shaver broke down last time, I threw it away because there was nothing. There is no repair option. When you try to get it fixed, it costs more. So I threw it away and bought a new one."

Participant 11: "If it is a more expensive electronic product, it is as if we are in favor of keeping it. But with simpler products, even a hair dryer is not a very expensive product, but last time it broke down. Something like this happened. We thought about whether to throw it away or not. We preferred to have it repaired, in other words, let's go and get it repaired. Since the price he said for the repair was almost the same as the new product, we said okay then, we don't need to have it repaired, let's buy a new product, we threw the hair dryer in the trash."

Similarly, another participant stated the following.

Participant 8: "If it is a very small thing, it is thrown away, but laptops and such are usually left behind. I was left like that. At least kitchenware and such are thrown away. And people usually throw it away because they don't know what to do."

Storing at Home

Participants emphasized 18 times that they store unused electronic devices at home. Participants explained that they usually keep their old electronic devices at home for various reasons, such as the possibility of needing them in the future, not knowing sustainable waste disposal options, or simply keeping them because they do not take up much space.

One participant stated the following.

Participant 1: "For example, all my phones, all my old phones are at home. I did not throw any of them away. They are all at home. For example, computers, up until now. This is my third personal computer. I still use my previous computer. My father used the one before. It is not used much anymore, but it is still at home, we did not throw it away. You know, there are usually a lot of cables and such. They are not used anymore, but they are all at home."

Another participant emphasized how electronic waste accumulates over time.

Participant 7: "For example, I had a very old Samsung

phone. For some reason, even when I was moving from Izmir to Muğla, I took it to Muğla even though it was broken. When we say electronic waste, of course its battery was broken, I had torn it apart, wondering if it could be repaired. In other words, it was actually electronic waste, but I didn't throw it away. I don't know what I did with it now, but it stayed with me in Muğla for many years. Because I couldn't throw it away even though it didn't work. But I don't remember what I did with it afterwards. By the way, if I had thrown it away, it wouldn't have come back directly, maybe I threw it away, I might have thrown it away when I was finally moving, but specifically, I kept it waiting for many years." These insights show that although many people are aware of the importance of sustainable disposal, the difficulties experienced in practice and lack of knowledge often lead them to adopt unsustainable behaviors.

Encouraging Factors

Among the factors that encourage sustainable disposal of electronic waste, awareness and information subcode (n = 15) emerged as the most important factor. It is followed by ease of access (n = 9), financial incentives (n = 5), increasing supplier responsibility (n = 3), extending warranty periods (n = 2) and developing normative behavior (n = 2) subcodes, respectively (Figure 3).

Figure 3.

Encouraging Factors Hierarchical Code-Subcodes Model
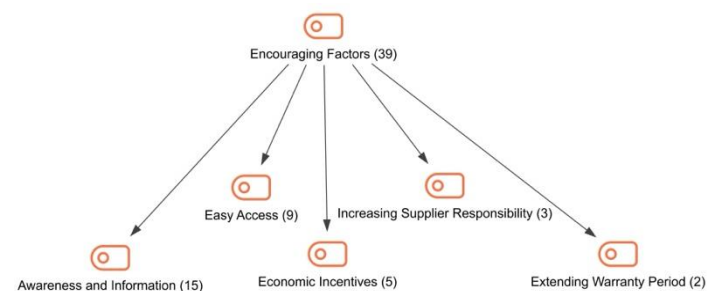
Awareness and Information

A large number of participants stated that the lack of information about the recycling process of electronic waste reduces people's motivation to engage in sustainable disposal behavior. One participant expressed his opinion on this situation as follows.

Participant 1: "There is also something like this, maybe

I throw away what we give away. As I said, there is one in the neighborhood, but we don't know what happens. If we could actually see the results of this, if there was something like, the electronic waste you threw here turned into something like this, yes, it would be more encouraging. So even if I throw it there now, what will happen, it doesn't seem like anything will happen."

Likewise, the participants get uncertainty about how efficient are electronic waste collection points. Such uncertainty deters people from participating in the sustainable disposal process.

Participant 2: "But if I see that the battery I separated, the battery collection point I threw it at, is being done correctly, maybe it would be an incentive for me. Because you don't know, I don't know how it works and this. Even if I do it this way, I don't think it will be separated or done correctly. Because, for example, it happened to me before, I throw a bag full of it. I'm talking about the times when we used it more. I threw a bag full of batteries into the battery collection thing. I looked and saw that all the batteries in it had leaked, stuck to each other, and were gone because of the heat. In fact, the thing we wanted not to damage had formed there, in other words, it had formed there and the battery water was flowing down. So, if I saw that this would work, it would be an important incentive for me, but I don't believe it would work."

These findings obtained from the participants indicate that providing clearer and more accessible information about the recycling process will increase public participation in sustainable disposal practices.

Easy Access

Participants stated that the current infrastructure for disposing of electronic waste is insufficient and that the system should be made more accessible.

Participant 10: "For example, if there was such a container just for electronic waste, I would also throw it in there. Because look, I throw away glass, it says green, it says white, I throw away things, I throw away clothes. I throw away the same battery box because we have it in our apartment, but if a system was also created for electronic waste, I would happily use it."

Participants also stated that municipal services that collect electronic waste from homes could increase participation in sustainable disposal behavior.

Participant 3: "They need to be close to me, location or

accessible to me, like the municipality example I mentioned before, they need to come and pick it up from home."

Economic Incentives

The participants in the study suggested that monetary incentives could encourage individuals to dispose of their electronic waste in a sustainable manner. Participants also emphasized the effectiveness of exchange campaigns.

Participant 6: "First. For example, the first thing that comes to my mind could be an economic incentive. For example, some stores run campaigns such as bring your old one, buy a new one, bring your old one, we will give you this much discount, buy a new one. I think this could be the first."

Another issue emphasized by the participants was that low second-hand sales values often lead people to throw away their devices or store them at home.

Participant 11: "So, the primary thing here is probably the economic incentive. When I take a phone and give it to a phone shop, I don't put it into circulation because the price they tell me is low. In other words, I say it's not worth it at all. If I feel good about the return I get in return, then of course my opinion will change. I would like to sell it again. Because there are definitely people who use it. As I said. We said paid military service, 1100 is a very simple phone but a person can become in need of it. They want to use it, not just because they need it, but even someone who just needs to communicate financially can go and buy it. Someone who is not good for camera work, who doesn't use social media, who just wants to call their family can use it. But I guess the primary thing is the economic incentive. Could there be any other incentive? In other words, does the conscientious aspect weigh heavily? I don't know. I think we as humans won't realize this unless very, very bad things happen to us. Okay, first of all, the economic incentive is what we need the most, especially in an inflationary environment."

Increasing Supplier Responsibility

Participants stated that manufacturers and retailers should take more responsibility for the sustainable disposal and recycling of electronic products.

Participant 2: "I also think that companies should do this more than consumers. I think like this. For example, I buy a shaver. I think that the basic parts of this shaver should not deteriorate, only the blade, for example, I

should change it over time. Apart from that, the shaver I buy should last 20 years, 10 years. But they don't do that either. I feel that way as a consumer because they want me to buy more, planned obsolescence. They make products that can deteriorate quickly. The product deteriorates very quickly. I will try to have it repaired. In processes, it is the consumer's fault, we don't do this like this, we don't do that like that, etc. Instead, I prefer to buy a new one. Therefore, I think this is something that falls on companies more than consumers. For example, if there is an incentive like this, I throw away my shaver and it breaks down, we give it a 3-year lifespan. If it breaks down within 3 years, bring the new one, it is out of warranty, bring the old one. It should be like we are giving this much discount, we are already replacing it within the warranty. Or maybe renewed products can be offered as a purchase option not in hygienic products but in other products, but there is no other way. For example, this is the case with mobile phones. There are new products, renewed mobile phones, repaired products, for example. People still do not trust them there. That is why you do not consume, you do not buy. Even if these products are put back on the market, I do not buy them again because I do not trust them. Therefore, maybe the trust there can be provided for the incentive."

Extending of Warranty Period

It has been revealed that extending the warranty period of electronic devices can encourage consumers to adopt sustainable consumption habits.

Participant 5: "This warranty period is definitely an encouraging situation. If I have given it to my own supplier, let's say in the first malfunction, for example, even if there is a user error in the supply of parts, an incentive can be provided. In other words, in a product that comes back to the supplier as a one-time user error, they should cover the repair cost or the new product instead of the user. Also, if I think that the old products I give to the supplier are not used and they throw the products away again, I see this as a disadvantage. In other words, I have learned from somewhere that yes, they actually buy from us but they do not use them in any way, they throw them away instead of me. If I learned this, I would not want to do it."

Development of Normative Behavior

Finally, the participants stated that encouraging normative behaviors regarding the disposal of electronic waste is essential to ensure long-term sustainability.

Participant 11: "For example, in my own home, I am responsible for this. I have to do these things, but in workplaces or other places, those institutions need to do these things. Institutions need to do things to encourage this. For example, if you have battery waste, you will put it in this bag. For example, they can provide bags for the rooms. Or at least they do these things on the floors. But at least it can also show us that these are separated. Secondly, I think that the containers in the places we live and that we can access should at least be separated so that we can do this. Because I guess it is like that in Europe. In some cities, at least the bins are put somewhere else, garbage, household waste is put somewhere else. I think we need to pay attention to these. There is something like this here. Again, the municipality can do it, but we may not be able to do it. I think this will happen over time. I mean, maybe in the medium term, as people do it, as it becomes normative, maybe people will turn it into a behavior. But first of all, we need to be conscious and do this, and I think we need to sell things that are suitable for this in places we can access, in markets, I don't know."

These views of the participants emphasize the importance of a multifaceted approach that combines awareness, accessibility, incentives and policy measures to develop sustainable e-waste management.

Inhibiting Factors

This section of the study examined the factors that prevent individuals from engaging in sustainable disposal behavior. As shown in Figure 4, these factors are divided into six subcode groups. The most important barrier to sustainable waste disposal behavior was determined to be lack of knowledge and awareness (n = 24). This was followed by lack of access (n = 10), keeping devices as spares (n = 9), doubts about the effectiveness of recycling (n = 9), and avoiding effort-intensive processes (n = 7).

Figure 4.

Inhibiting Factors Hierarchical Code-Subcodes Model
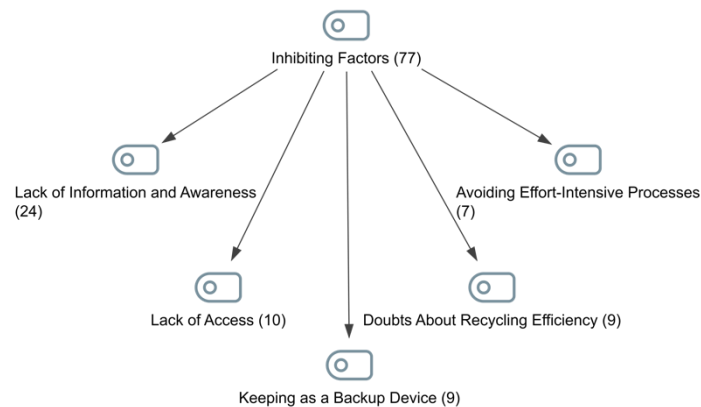
Lack of Information and Awareness

Many participants stated that they did not have enough information on how to dispose of their electronic waste in a sustainable manner.

Participant 1: "If I dispose of it in a recyclable way, I honestly don't know where to give it. I mean, there are waste bins in our neighborhood, for example. There is something called electronic waste there, but I don't know if it gets converted or not when you throw it there. Or, I don't know if there is a place specifically for this that I can give it to."

Lack of Access

Some participants stated that their distance from waste collection points makes sustainable disposal more difficult.

Participant 3: "Not being close. For example, if it is something too heavy to carry, I throw it in the nearest garbage can. Access difficulties can prevent me from engaging in sustainable disposal behavior."

Keeping as a Backup Device

Many participants tend to keep unused electronic devices, believing that they may come in handy in the future.

Participant 9: "I mean, there is a tangled mess of cables and old headphones in my house. I don't really know what to do with them. I mean, they probably go into recycling. I don't know much, but I think that maybe the person who sent them might come in handy again. I usually keep them at home, especially old phones, that's how they are."

Doubts About Recycling Efficiency

Some participants expressed doubts about whether recycling processes are really functional. Participants who were skeptical also had less motivation to engage in sustainable disposal behavior.

Participant 11: "There's also something like this, maybe I throw away what we give away. As I said, there's one in the neighborhood, but we don't know what happens. If we could actually see the results of this, if it were like, the electronic waste you threw away here turned into something like this, yes, it would be more encouraging. I mean, even if I throw it there right now, what will happen? It doesn't seem like anything will happen."

Avoiding Effort-Intensive Processes

Certain disposal methods such as selling second-hand devices are perceived by participants as time-consuming and complicated, which prevents consumers from using these methods.

Participant 1: "Apart from that, I also find it very time-consuming to sell. How can I say it, I'm too lazy to say it because there are platforms for that, but you're going to put it there, people will buy it, they'll do something they don't like, they'll give it back, etc. So I'm saying that until I give it to them, yes, if there are people around me who need it, it's easier to give it directly, but selling it seems like a lot of work to me."

Other Inhibiting Factors

Apart from the factors categorized in the hierarchical code-subcode model, participants identified additional obstacles that prevent them from engaging in sustainable disposal behavior.

Price Dissatisfaction (n = 4): Some participants stated that they stopped selling their second-hand electronic devices due to low second-hand market prices.

Participant 11: "They are not given as second-hand either. Because they usually say a very low price."

Lack of Policies (n = 4): Some participants think that public policies supporting recycling are insufficient.

Participant 7: "Even if we knew, from the top perspective, since we know that there is nothing in terms of this policy, maybe we continue this behavior. In other words, nothing is actually being done at the top, what can

I do as a consumer? If I knew, I would really research and find out that while managers say this, policy makers are doing something about this. But they never let us know about what they are doing."

Privacy Concerns (n = 4): Several participants emphasized that they have given up on disposing of their electronic devices sustainably due to concerns about personal data security.

Participant 6: "I also think that since most of our personal information is on our computers and phones, even if we delete it, sometimes I have a concern that someone who knows computers very well might access it. Yes, and I am sure many people have this concern. So even if I reset everything, reset it to factory settings, I don't want to give it away in case someone gets their hands on it and accesses my personal information. I have that concern, I can add that as well."

Based on these findings of the study, in order to ensure that individuals engage in sustainable disposal behaviors and increase the effectiveness of recycling initiatives, first of all, awareness should be raised and measures and improvements should be made to meet the need for improved accessible infrastructure.

Economic Value of Electronic Waste

Participants also emphasized that electronic waste has economic potential, especially in terms of reusable components (n = 10) and precious metals (n = 2) (Figure 5). Participants' views show that they are aware that recycling will contribute to creating economic value by showing that e-waste is not only a waste but also a resource. Participants also suggested that raising public awareness about the economic value of e-waste could further encourage consumers to engage in sustainable disposal behaviors.

Figure 5.

Economic Value of E-Waste Hierarchical Code-Subcodes Model

Economic Value of Electronic Waste (12)

Reusable Parts (10)   Recovery of Valuable Metals (2)
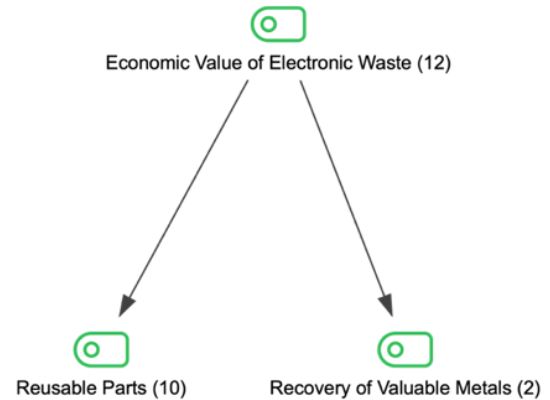
Reusable Parts

The presence of reusable parts in electronic waste is an important factor that increases the economic value of electronic waste. Participants of the study also emphasized the importance of recycling spare parts in particular during the interviews.

Participant 5: "If there are usable spare parts, purchasing them shows that their economic life is an economic value."

This statement emphasizes that electronic waste does not only consist of single-use materials; on the contrary, when processed using appropriate methods, reusable parts are obtained from them and thus can provide economic benefit to the consumer.

Recovery of Valuable Metals

Participants also stated that electronic waste contains a certain amount of recyclable precious metals. They especially mentioned in the interviews that older generation electronic devices such as motherboards generally contain valuable materials such as gold.

Participant 4: "Of course not? I mean, maybe it could have been more before, I don't know now, but in the past, for example, in order to make a motherboard, there was a certain amount of gold in the motherboard. These could be separated and sold as gold. I know there are people who are after these. These are very common, especially in old

push-button telephones. It would have been good if we had known about this at the time. I don't know about them now, but of course they are still there. Because they are made of different elements. It would be good to separate them from an economic perspective." This statement highlights the economic potential of extracting and recovering precious metals from electronic waste. Participants suggested that raising awareness of these processes and improving their implementation could provide both individual and societal economic benefits.

Code Map

Code maps are tools that help understand the relationships between conceptual categories that are frequently used in qualitative data analysis. Such code maps are closely linked to qualitative research methods such as grounded theory and content analysis. In particular, the grounded theory approach of Corbin and Strauss (1990) is important for analyzing the conceptual structures derived from the data. The spatial relationships between these codes provide insight into how various factors shape recycling behaviors at both individual and societal levels. The code map presented in Figure 6 highlights key themes related to environmental sustainability, such as recycling, waste disposal, and donation, while barriers such as lack of knowledge, economic constraints, and low awareness also come to the fore.

Figure 6.

Code Map
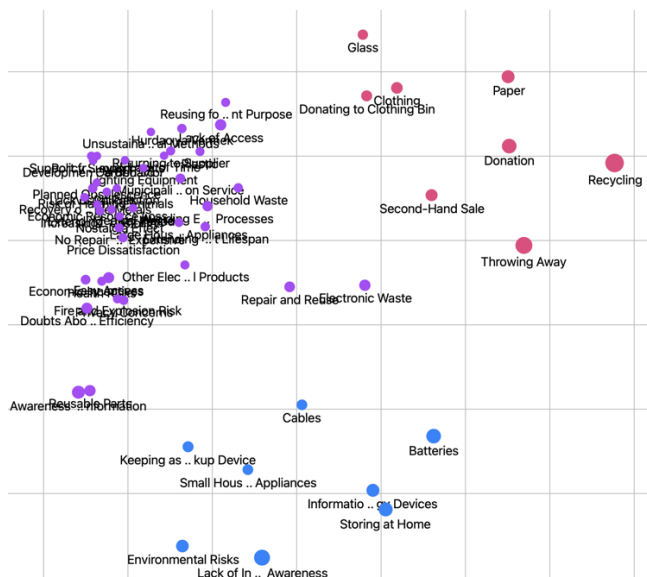
Key Findings in the Code Map

Macro Themes and Prevalence

When the Code map in Figure 6 is examined, it is determined that concepts such as "Recycling" and "Throwing Away" appear larger compared to other categories. This shows that these themes are coded more frequently in the data set and therefore dominate the analyzed data set. In particular, the fact that the "Throwing Away" subcode is included as a large cluster in the code map proves that throwing waste directly into the trash instead of recycling is a more common tendency.

Individual and Structural Barriers

Various barriers to recycling behavior also come to the fore in the code map, including "Lack of Information and Awareness", "Economic Factors", "Environmental Risks" and "Municipal Services". These factors are considered as both individual and structural barriers that negatively affect sustainable waste management practices within the scope of the study. According to Ajzen's (1991) Theory of Planned Behavior, an individual's intention to perform a certain behavior is directly related to the level of knowledge and awareness. If individuals do not have sufficient knowledge about recycling, they will be less likely to adopt this behavior. When the economic factors included in the code map are considered in the context of Maslow's hierarchy of needs (1943), it is predicted that individuals will prioritize their basic economic needs before acting towards higher-level goals such as environmental sustainability. The financial burden that recycling processes will bring can be seen as an inhibitory effect on developing sustainable habits.

Alternative Waste Management Methods

The code map also includes categories such as "Donation" and "Second-hand Sales". These categories show that individuals adopt other sustainable waste management practices in addition to traditional recycling. In particular, second-hand sales and donations are closely related to the concepts of circular economy and shared consumption. According to the Ellen MacArthur Foundation's circular economy model, extending the life of products is a critical and sustainable strategy that provides long-term benefits for reducing waste production.

Electronic Waste and Storage Trends

The presence of subcodes such as "Electronic Waste (E-Waste)", "Batteries" and "Home Storage" in the code map emphasizes that consumers tend to store electronic devices at home instead of disposing of them sustainably. This behavior once again underlines the lack of awareness and knowledge about appropriate e-waste disposal processes.

When considering the environmental impact of e-waste, the Green Consumption Theory comes to the fore. This theory, proposed by Peattie (1992), suggests that individuals with high environmental awareness apply their consumption habits and waste management practices according to sustainability principles. However, the lack of knowledge among consumers again emerges as a significant obstacle to achieving this goal.

When the code map is considered in general, the findings particularly emphasize the need for awareness campaigns and incentive mechanisms to encourage recycling behaviors. Awareness campaigns and education programs aimed at increasing environmental awareness among consumers are expected to encourage greater participation in waste management processes. In addition, economic incentive mechanisms such as deposit-refund systems are expected to make recycling more attractive to individuals. Finally, structural improvements that will increase accessibility to municipal waste collection and recycling services will increase public participation in sustainable waste disposal.

Conclusion

This study examined the factors affecting consumers' e-waste disposal behaviors within the scope of the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). The findings of the study show that consumers' sustainable disposal behavior is shaped by psychological, structural and social factors. In addition, these factors play an important role in determining individuals' interaction with e-waste recycling systems. The study highlights the importance of easy access to recycling infrastructure and economic incentives as the main facilitators of sustainable disposal behavior. On the other hand, information gaps, lack of trust in recycling systems and lack of strong social norms were determined as the inhibitors of sustainable disposal behavior. .

One of the most important contributions of this study

is that it integrates TAM and TPB to provide a comprehensive examination of e-waste disposal behaviors and explains the findings with integrated theoretical structures. The results support that consumers' participation in e-waste recycling largely depends on perceptions of convenience and perceived benefits. In particular, economic incentives such as exchange programs and deposit-refund systems have been identified as effective motivators for encouraging sustainable disposal habits.

Policy and Practical Implications

The findings of this study suggest that effective e-waste management requires a holistic approach that includes infrastructure improvements, economic incentives, regulatory measures, and behavioral interventions. Several important improvements for policy makers and practitioners have been suggested based on the analysis findings. First, increasing the accessibility of e-waste collection points and integrating take-back programs in retail stores will increase participation in recycling activities. Strengthening public awareness campaigns is equally important, as educational initiatives are expected to help fill existing knowledge gaps and increase trust in the recycling process. In addition, financial incentives such as deposit-refund schemes and take-back programs were frequently mentioned by participants as encouraging responsible disposal behaviors.

Social impact strategies should also be utilized to promote sustainable e-waste disposal behavior. Community-led initiatives and partnerships with environmental organizations will help strengthen responsible consumption models such as donations, second-hand sales, etc. In addition, regulatory frameworks should be strengthened, particularly through the implementation of Extended Producer Responsibility (EPR) policies that hold manufacturers accountable for the lifecycle management of their products. Finally, encouraging circular economy practices through right-to-repair laws and certified refurbished electronics markets will further extend product lifespans, thereby reducing waste generation. By implementing these strategies, the study findings highlight the need for governments, businesses, and organizations to collaborate to create a more sustainable waste management system. This will facilitate a transition to a circular economy where e-waste is minimized, resources are conserved, and sustainability is prioritized.

Limitations and Future Research

This study has certain limitations. The relatively small sample size may limit the generalizability of the findings. Additionally, the sample predominantly consisted of highly educated individuals, which may not reflect the perspectives and behaviors of the general population. A further limitation is the lack of diversity in participants' professional backgrounds, particularly in terms of the public versus private sector distinction. This may have constrained the range of viewpoints represented in the study. Moreover, since the study was conducted in a specific geographic and cultural context, the findings may not be directly applicable to other regions.

Future research is recommended to conduct longitudinal studies to examine how disposal behaviors evolve over time. Comparative studies across different socioeconomic and occupational groups, including both public and private sector employees, could provide valuable insights into variations in e-waste management practices. Finally, empirical studies investigating the effectiveness of policy interventions such as financial incentives and awareness campaigns could generate practical recommendations to improve sustainable disposal behaviors on a larger scale.

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Genişletilmiş Özet

Elektronik atık (e-atık) yönetimi, günümüzün en önemli çevresel sorunlarından biri olarak öne çıkmaktadır. Hızla artan teknoloji tüketimi, ürün yaşam döngülerinin kısalmasına ve e-atık miktarının giderek artmasına yol açmaktadır. Ancak, tüketicilerin bu atıkları nasıl elden çıkardığı, sürdürülebilir atık yönetimi stratejilerinin başarısı açısından kritik bir faktördür. Bu çalışma, tüketicilerin e-atık elden çıkarma davranışlarını etkileyen kolaylaştırıcılar ve engelleyici faktörleri incelemekte ve bu süreçleri anlamak için Planlı Davranış Teorisi (TPB) ve Teknoloji Kabul Modeli (TAM) çerçevesinden yararlanmaktadır.

Araştırma, nitel bir yöntem benimseyerek, amaçlı örnekleme yöntemi ile seçilen 11 katılımcı ile yarı yapılandırılmış görüşmeler gerçekleştirmiştir. Veriler, MAXQDA yazılımı aracılığıyla tematik analiz yöntemiyle incelenmiştir. Bulgular, e-atıkların sürdürülebilir şekilde elden çıkarılmasını teşvik eden en önemli unsurların erişilebilir geri dönüşüm altyapısı ve ekonomik teşvikler olduğunu ortaya koymaktadır. Buna karşılık, geri dönüşüm sistemlerine duyulan güvensizlik, bilgi eksikliği ve sosyal normların yeterince güçlü olmaması gibi faktörler, tüketicilerin sürdürülebilir atık yönetimine katılımını engellemektedir.

Araştırmanın önemli katkılarından biri, e-atık yönetimi bağlamında bireysel davranışların teknoloji kabulü ve planlı davranış teorileri çerçevesinde nasıl şekillendiğini anlamaya yönelik derinlemesine bir perspektif sunmasıdır. Özellikle ekonomik teşviklerin ve altyapının sürdürülebilir elden çıkarma davranışları üzerindeki etkisi net bir şekilde ortaya konmuştur. Bu bağlamda, araştırma bulguları ışığında, politika yapıcılar ve uygulayıcılar için bir dizi öneri sunulmuştur.

Öneriler kapsamında, öncelikle geri dönüşüm altyapısının genişletilmesi ve tüketicilerin e-atıklarını daha kolay elden çıkarabilecekleri sistemlerin oluşturulması gerektiği vurgulanmaktadır. Kamuoyunda farkındalığın artırılması ve tüketicilere e-atık yönetimi konusunda daha fazla bilgi sunulması, geri dönüşüm süreçlerine güvenin artırılması açısından kritik bir unsur olarak değerlendirilmektedir. Ayrıca, depozito-iade sistemleri ve geri alım programları gibi ekonomik teşvik mekanizmalarının uygulanmasının, tüketicileri sürdürülebilir elden çıkarma davranışlarına yönlendirmede etkili olabileceği belirtilmektedir. Bunun yanı sıra, üreticilerin e-atık yönetiminde daha fazla sorumluluk üstlenmesini sağlamak adına Genişletilmiş Üretici Sorumluluğu (EPR) politikalarının uygulanması gerektiği ifade edilmektedir. Son olarak, döngüsel ekonomi anlayışı doğrultusunda, tamir edilebilir ve daha uzun ömürlü ürünlerin teşvik edilmesi ile ikinci el piyasalarının güçlendirilmesi önerilmektedir.

Bu çalışma, e-atık yönetimine yönelik akademik ve pratik katkılar sağlamanın yanı sıra, sürdürülebilir tüketici davranışlarının nasıl teşvik edilebileceği konusunda önemli içgörüler sunmaktadır. Elektronik atık yönetimi konusundaki gelecekteki araştırmaların, farklı sosyo-ekonomik gruplar arasında e-atık elden çıkarma davranışlarını karşılaştırmalı olarak incelemesi ve uzun vadeli eğilimleri değerlendirmesi önerilmektedir. Ayrıca, farkındalık kampanyaları ve ekonomik teşviklerin etkilerini deneysel yöntemlerle test eden araştırmalar, sürdürülebilir atık yönetimi stratejilerinin geliştirilmesine önemli katkılar sağlayacaktır.

Sonuç olarak, artan elektronik atık miktarı çevresel ve ekonomik açılardan önemli zorluklar yaratmaktadır. Bu sorunun üstesinden gelmek için altyapı geliştirme, politika yenilikleri ve davranışsal müdahalelerin birlikte uygulanması gerekmektedir. Erişilebilirlik, farkındalık ve teşvik mekanizmalarının güçlendirilmesi ile sürdürülebilir e-atık elden çıkarma davranışları yaygınlaştırılabilir ve çevreye duyarlı bir döngüsel ekonomi modeli benimsenebilir.